GROUNDWATER SAMPLING PLAN

ROUND FOUR

ROSE CHEMICALS SITE

1/29/90

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Groundwater samples will be obtained from each of the 22 groundwater monitoring wells at the Rose Chemicals Site. All health and safety requirements for the collection of groundwater samples are detailed in the Site Health and Safety Plan, Rose Chemicals Site, Holden, Missouri (HSP), Burns & McDonnell Engineering Company, January, 1989. The following sections detail the sampling protocol for this fourth round of sampling.

A. Sampling Device

Factory pre-decontaminated (liquinox wash with distilled water rinse and sealed in plastic wrap) chemical-resistant polyethylene disposable bailers attached to lengths of polypropylene rope will be used to purge each well and to obtain groundwater samples. A new bailer will be used to purge each well. Another new bailer will be used to sample each well. The bailers and rope will be stored in plastic bags prior to their use. After use the bailers and rope will be placed in DOT-approved 55-gallon drums which will be handled as described in Part IV of the approved Sampling and Analysis Plan, Rose Chemicals Site, Holden, Missouri (SAP), Burns & McDonnell Engineering Company, January, 1989.

B. Water Level Measurement

Before purging, the static water level will be measured using a Soil-Test DR-760A, a Solinst Model 101, or a Well Wizard Model 6000 water level indicator. Prior to initial use the water level measuring equipment will be decontaminated following the procedures outlined in Part III, Section E of the approved SAP.

The procedure for water level measurements is as follows:

1. Lower instrument wire into well until indicator bulb light glows or the audible tone sounds.
2. Fine-tune the level using the survey indicator mark on the top of the PVC monitoring well casing.
3. Measure the distance to the water level using the closest 1-foot division on the wire and a straight ruler with 0.01-foot divisions.
4. Record water level to the nearest 0.01-foot in the logbook.
5. Lower the wire until the bottom of the well is reached. Measure and record the well depth to the nearest 0.1-foot.
6. Compare measured well depth to well depth recorded during well installation, and record any difference.
7. Subtract the water level from the well depth to obtain the depth of static water. Calculate the number of gallons in one well volume. Record in logbook.
8. After use, rinse the wire thoroughly first with distilled water and then with methanol and allow to dry.

C. Well Purging

Water that stands in a well casing between sampling periods becomes stagnant, and the chemical composition may be altered. To obtain a representative sample, the well must be purged before withdrawing the sample.

Purging of all deep wells shall be completed before beginning the purging of shallow wells. The order of purging will proceed from the wells historically yielding no detectable compounds to those with the most detectable compounds. The deep and shallow wells will be purged in the following order:

Deep Wells	Shallow Wells
103	205
105	206
109	209
111	202
110	208
108	203
102	211
104	201
101	210
106	204
107	207

To prevent accidental contamination of the sampling equipment by surface soil, a nylon tent will be placed (with the entrance facing downwind) over the wells being sampled. A clean plastic sheet then will be placed inside the tent around the well protectors. All purging will be performed by two people working inside the tent. A portable table will be used so that instruments and samples are stored off the floor of the tent. The tent will be transported between well locations in a set-up condition. No vehicles will be operated in the area of the wells being sampled to minimize generation of airborne VOCs. A new bailer and new length of polypropylene rope will be used for purging each well. Sampling personnel will put on a new pair of latex gloves and a clean plastic apron when beginning operations at a new well.

Each well will be purged to dryness or to remove a minimum of 3 well volumes and allowed to recover overnight (approximately 24 hours) before sampling. If the well cannot be sampled on the following day, the well will be purged again prior to sampling. All water generated during well purging will be retained in containers for subsequent disposal as described in Part IV of the SAP. All solid waste materials generated during well purging, including bailers, plastic sheeting, and polypropylene rope will be disposed of as described in Part IV of the SAP.

D. Sample Collection

The same measures used during purging to prevent contamination by surface soil and cross-contamination between wells will be used during sampling (nylon tent, disposable bailers, plastic sheeting). The order of well sampling will also be the same as described previously for well purging. Unfiltered groundwater samples will be collected from each well in order of volatilization sensitivity, as follows:

- Volatile Organic Compounds (VOCs)
- Semivolatile Organic Compounds (SVOCs)
- PCBs

Portions of unfiltered samples from each well will be designated on the Chain-of-Custody form for laboratory filtering and subsequent analysis for PCBs and SVOCs. Filtering will be done in the laboratory to minimize the potential for field contamination of the samples. If a well will not provide sufficient water for all analytical samples, analytical testing will be designated in the following order of descending priority:

- o VOCs
- o PCBs (unfiltered)
- o PCBs (filtered)
- o SVOCs (unfiltered)
- o SVOCs (filtered)

Separate samples will be collected and tested for temperature, pH, and specific conductivity immediately after VOC sample collection and again within 30 minutes after complete sample collection as a check on the water stability over time. The readings will be taken approximately 30 seconds after collection of the sample. The probes of instruments used for these analyses will be rinsed with deionized water between each use. The instruments will be calibrated daily.

New sample containers necessary for completing field sampling and quality control requirements will be provided to the field personnel by the laboratory. The sampling procedures are as follows:

1. See that the purge requirements are met for location(s) to be sampled (as described above).
2. Have all necessary equipment and supplies prepared and available.
3. Verify adequate respiratory safety protection if not done prior to entering field (refer to HSP).
4. Measure and record water level (as described above).
5. Select sample bottles and preservative, if necessary.
6. Attach precleaned bailer to new rope for lowering.

7. Repeat the following steps indicated by an (*) as needed to acquire sufficient volume of sample.
8. Lower bailer slowly until it contacts water surface*.
9. Allow bailer to sink to the screened zone and fill with a minimum of surface disturbance*.
10. Slowly raise bailer to surface; do not allow bailer rope to contact ground*.
11. Tip bailer to allow slow discharge from top to flow gently down the side of the sample bottle with minimum entry turbulence*.
12. Check that a Teflon-liner is present in cap of the sample bottle, if required; secure the cap tightly.
13. Invert VOC sample container immediately after filling to check for air remaining in the container; no air bubbles should be present. If air is noted to be present, the container will be refilled. If insufficient water is left in the bailer, a new bailer full of water will be collected and both VOC sample bottles refilled from the same bailer.
14. Label the sample bottle with an appropriate label and cover with clear tape; complete the label with all necessary information; record the information in the field logbook; and complete all Chain-of-Custody documents.
15. Mark liquid levels on the remainder of containers with tape or a marker. Only VOC samples need to be filled with no air in the bottle.
16. Place the properly labeled sample bottle in an appropriate carrying container (cooler with ice). All VOC containers will be packed in polyethylene cubitainers filled with activated carbon, in an inverted position to minimize loss of volatiles.

17. The sample containers will be transferred to the laboratory in a Burns & McDonnell vehicle. Upon arrival at the laboratory, the laboratory personnel will note any loss of sample volume or presence of air in VOC samples. The laboratory will notify Burns & McDonnell immediately if sample loss has occurred.

E. Sample Preservation

Table III-6 of the SAP presents a summary of the required sample containers, preservatives and maximum holding times for each sample matrix. The container volumes and sample sizes are shown in Table III-7 of the SAP. All groundwater characterization samples will be iced as soon after field collection as practical. The intent is to lower the fluid temperature near to (but above) freezing as soon as possible to decrease the rate and minimize the amount of physicochemical change of the sample before submittal to the analytical laboratory.

The sample bottles will be labeled prior to filling, and a Chain-of-Custody Record will be prepared for each shipment. Each cooler will be sealed shut with the sampler's signature on the seal tape. Chain-of-Custody procedures are discussed in detail in the Quality Assurance Project Plan (QAPP), Burns & McDonnell Engineering Company, January, 1989. The ice will be replaced before the cooler is sealed and shipped to the laboratory as described in the QAPP.

F. Replicate and Field Blank Samples

One set of replicate samples and one field blank will be collected during each day of sampling activities. The sample volume for the replicate

samples will be collected in the same manner as the investigative groundwater samples described in this Section. Replicate samples will be obtained from the same bailer of water, if possible. If more than one bailer of water is required, the volume of groundwater from each bailer will be uniformly distributed between sets of identical sample containers in order to obtain the replicate samples. The containers will be given unique sample numbers and preserved in the same manner. Additional water from the wells which are sampled in replicate will be collected and designated for use by the laboratory in their daily matrix spike/matrix spike duplicate analyses. If possible, the replicate samples and MS/MSD samples will be taken from the following wells: MW-105, MW-106, MW-202 and MW-211. Different wells may be used, however, depending on field additions. The field blanks will be prepared in the manner described in the QAPP, except that reagent grade deionized water will be run over a length of rope as well as a clean bailer to obtain the sample.

G. Trip Blanks

Trip blanks for VOCs in groundwater will be prepared and shipped to the laboratory as described in the QAPP. It is estimated that six days will be required for this round of groundwater sampling, and the cooler(s) will be shipped each day. Since one trip blank will be submitted per shipment of groundwater samples, a total of approximately 6 trip blanks will be submitted for analysis for this round.

H. Decontamination

The decontamination procedures for the water sampling equipment are detailed in Section E of Part III of the SAP. These procedures will not be changed for this sampling round; however, where distilled water rinses are called for in the SAP, reagent grade deionized water will be used.

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